(2)

DNA-TR-84-108

# POSSIBLE U. S. SLCM NEGOTIATING OPTIONS

John J. Ballantine
Ethan S. Burger
TITAN Systems, Inc.
6833 Beverly Road
McLean, VA 22101





1 October 1983

Technical Report

CONTRACT No. DNA 001-82-C-0088

THIS WORK WAS SPONSORED BY THE DEFENSE NUCLEAR AGENCY UNDER RDT&E RMSS CODE B383083466 V99QAXNN00017 H2590D.

Prepared for
Director
DEFENSE NUCLEAR AGENCY
Washington, DC 20305

[redacted]

[redacted]

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE | | READ INSTRUCTIONS BEFORE COMPLETING FORM |
|---|---|---|
| 1 REPORT NUMBER<br>DNA-TR-84-108 | 2 GOVT ACCESSION NO | 3 RECIPIENT'S CATALOG NUMBER |
| 4 TITLE and Subtitle<br>POSSIBLE U.S. SLCM NEGOTIATING OPTIONS [redacted] | | 5 TYPE OF REPORT & PERIOD COVERED<br>Technical Report<br>6 PERFORMING ORG REPORT NUMBER<br>TMN Control No. 83-0273 |
| 7 AUTHOR(s)<br>John J. Ballantine<br>Ethan S. Burger | | 8 CONTRACT OR GRANT NUMBER(s)<br>DNA 001-82-C-0086 |
| 9 PERFORMING ORGANIZATION NAME AND ADDRESS<br>TITAN Systems, Inc.<br>6833 Beverly Road<br>McLean, Virginia 22101 | | 10 PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS<br>Task V99QAXNN-00017 |
| 11 CONTROLLING OFFICE NAME AND ADDRESS<br>Director<br>Defense Nuclear Agency<br>Washington, D.C. 20305-1000 | | 12 REPORT DATE<br>1 October 1983<br>13 NUMBER OF PAGES<br>60 |
| 14 MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) | | 15 SECURITY CLASS (of this report)<br>[redacted]<br>15a DECLASSIFICATION DOWNGRADING SCHEDULE<br>[redacted] |

16 DISTRIBUTION STATEMENT (of this Report)

[redacted]

17 DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18 SUPPLEMENTARY NOTES

This work was sponsored by the Defense Nuclear Agency under RDT&E RMSS Code B383083466 V99QAXNN00017 H2590D.

19 KEY WORDS (Continue on reverse side if necessary and identify by block number)

Sea-Launched Cruise Missile
Arms Control
SLCM Platforms
SLCM Launchers
SLCM Negotiating Options

20 ABSTRACT (Continue on reverse side if necessary and identify by block number)

[redacted] This study identifies and evaluates five possible mechanisms for including the sea-launched cruise missile (SLCM) in the arms control process. It focuses on limits for deployed SLCMs. It does not deal with possible constraints on non-deployed SLCMs either in storage or undergoing final assembly. Other related issues such as the reloadability of SLCM launchers and non-U.S. NATO platforms are also discussed.

DD FORM 1473 (JAN 73) EDITION OF 1 NOV 65 IS OBSOLETE

[redacted]

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

[redacted]

[redacted]

[redacted]

TABLE OF CONTENTS

[redacted]







[redacted]

[redacted]

[redacted]

## LIST OF ILLUSTRATIONS

[redacted]





[redacted]

[redacted]

## LIST OF TABLES

[redacted]





Page 4 is blank.

[redacted]

[redacted]

# CHAPTER 1

## [redacted] EXECUTIVE SUMMARY

### 1.1 [redacted] BACKGROUND AND PROBLEM

[redacted] The U.S. cruise missile program has been one of the more nettlesome arms control issues since the Vladivostok Accord in 1974. For the Soviets, the cruise missile represented another attempt by the U.S. to exploit a unique technological capability to achieve military superiority over the U.S.S.R. The U.S., on the other hand, saw the cruise missile program evolve from the category of a SALT "bargaining chip" to an integral part of both its strategic and theater force postures.

[redacted] In Europe, the cruise missile has become a mainstay of the U.S./NATO nuclear force modernization effort. Its value at sea has recently been demonstrated by the Falkland Islands crisis. Clearly, the cruise missile is a versatile weapon system capable of performing a number of missions, both nuclear and non-nuclear, very well.

[redacted] The potential military value of the cruise missile to the U.S. (and Soviet Union) is evident. What is not clear is how such a weapon system would be integrated into a theater arms control framework. This is particularly true for the sea-launched variant, the SLCM. For example, a number of questions about limitations on SLCM range, armament, and platform must be considered. This draft report presents the results of TITAN Systems, Inc.'s research to date on possible SLCM negotiating options for the U.S. This study was prepared for the Defense Nuclear Agency and the Nuclear Negotiations Branch (OP-652) of the U.S. Navy.

### 1.2 [redacted] SCOPE

[redacted] This study identifies and evaluates five possible mechanisms for including the sea-launched cruise missile in the arms control process. It focuses on limits for deployed SLCMs. It does not deal with possible constraints on non-deployed SLCMs either in storage or undergoing final assembly.

[redacted]

---

* [redacted] SLCM has three variants at present: (1) land-attack nuclear, (2) land-attack conventional, and (3) anti-ship.



[redacted]

[redacted]

[redacted] The cutoff date for the information used in this study is May 1983.

1.3 [redacted] FINDINGS

1. [redacted] *In the Soviet view, a cruise missile (SLCM or GLCM) deployment without a strict range limitation poses an everpresent danger to Soviet strategic targets.*

[redacted]

2. [redacted] *A number of important issues about SLCM will have to be addressed before an agreement can be reached.*

[redacted] Some of the more salient points that will have to be addressed include the following:

- [redacted] An agreed-upon range definition for a long- and short-range SLCM.

[redacted]

- [redacted] Reload capability of SLCM launchers.

[redacted]

- [redacted] Surface-to-surface capable anti-submarine warfare (ASW) missiles.

[redacted]



[redacted]

[redacted]

- [redacted] NATO/Warsaw Pact SLCM platforms.

[redacted]

Page 8 is deleted.



[redacted]

[redacted]

# CHAPTER 2

## [redacted] SLCM IN THE ARMS CONTROL PROCESS

[redacted] The cruise missile first became an issue at the Vladivostok Summit in 1974. Since then, it has remained a bone of contention between Moscow and Washington. For the Soviets, the sea- and ground-launched (GLCM) variants seemed to be the source of greatest concern. Nonetheless, no real agreement has yet been reached on either of these two variants, although the GLCM is currently being considered in the Intermediate Range Nuclear (INF) talks. This chapter discusses five possible options for limiting the sea-launched cruise missile in an arms control framework. The chapter is divided into three sections. The first discusses the Soviet concern about the cruise missile in general. The second addresses issues involved in bringing SLCM into an arms control framework. And, the third discusses the five possible negotiating options.

### 2.1 [redacted] SOVIET CONCERN OVER THE CRUISE MISSILE

[redacted] The Soviets have sought through arms control provisions to place strict limitations on air-, sea-, and ground-launched cruise missiles. The SALT II negotiations provided ample evidence of this fact. In particular, the Soviets seemed to be most preoccupied with the SLCM and GLCM. Their cause for concern was threefold: (1) the cruise missile's accuracy and yield clearly put it into the category of a counterforce weapon, (2) the deployment of the SLCM and GLCM would likely alter the existing Eurostrategic and strategic balances in the U.S. favor, and (3) these missiles could decidedly change the escalation process.

[redacted]

---

* [redacted] The Pershing II is of equal concern to the Soviets.

[redacted]



[redacted]

[redacted]

> [redacted] for making strikes at vitally important Soviet strategic objectives in the western regions of the U.S.S.R., reckoning in this way to reduce the Soviet Union's ability to act in response to U.S. aggression.... It is clear that this alters the strategic situation, increases the danger of war for the United States and breaches the balance between the United States and the U.S.S.R.

[redacted] This Soviet preoccupation with the first strike potential of the cruise missile, particularly SLCM, has been voiced a number of times in recent months. One Soviet military analyst noted, for example, that U.S. battleships armed with Tomahawk cruise missiles

> [redacted] are essentially being allocated the role of carriers of additional forward-based systems. The fact that this is, in point of fact, a matter of increasing first-strike potential is actually admitted in U.S. military circles. The American naval journal United States Naval Institute Proceedings pointed out that the installation of cruise missiles on battleships could destabilize Soviet-American arms control accords.*

[redacted] In the Soviet view, these new systems would probably also change the escalation process. The Soviets have always maintained that a nuclear war in Europe would probably escalate to all-out nuclear war. But they appear to be particularly concerned that the cruise missile (SLCM and GLCM) would erase any escalation boundaries or firebreaks that now exist (if, in fact, any do exist) "between strategic and tactical weaponry, and [that these systems] would facilitate the lowering of the 'nuclear threshold' and increase the risk of nuclear war."

[redacted]

---

* [redacted] Foreign Broadcast Information Service, Soviet Union Daily Report, 21 January 1983, p. AA-13.

** [redacted] The SLCM is more flexible than GLCM in this regard. The decision to launch SLCM would rest with the U.S., thereby circumventing the potential problem of host country approval.



[redacted]

[redacted]

[redacted]

[redacted] For the purposes of this study, a SLCM was considered accountable (or limited) as a long-range system if it is capable of a range of 200 km or greater. Two hundred kilometers seems to be a reasonable compromise between a "tactical" and a "long-range" mission for the SLCM. Tactical here is defined as a system capable only of line-of-sight acquisition and intercept. Long-range refers to an over-the-horizon acquisition and intercept capability. A summary of some of the U.S. and Soviet SLCM systems that would be affected by this definition is presented in Table 2.

[redacted] In addition to a range definition, other important questions about SLCM will have to be addressed before an agreement can be reached. Seven issues have been identified thus far. A brief summary of each issue is presented below.

2.2.1 [redacted] Reload Capability of SLCM Launchers

[redacted]

---

* [redacted] The VLS can also launch Harpoon and the Standard missile.



[redacted]

[redacted]

Table 2. Soviet and U.S. Surface-to-Surface Missiles

[redacted]

| Type | Range in km | Nuclear Capable | Mid-Course Guidance |
|---|---|---|---|
| [redacted] | | | |

[redacted]

a [redacted] ASW weapon with surface-to-surface capability.
b Projected.

Source: DIA, Aerodynamic Missile Handbook, U.S.S.R./China [redacted], [redacted] 1982.



[redacted]

[redacted]

2.2.2 [redacted] Interchangeability of Missiles with Launchers

[redacted]

2.2.3 [redacted] Surface-to-Surface Capable Surface-to-Air Missiles (SAM)

[redacted]

2.2.4 [redacted] Surface-to-Surface Capable Anti-Submarine Warfare (ASW) Missiles

[redacted]

---

*[redacted] The Standard is still capable of being used as a surface-to-surface missile.

**[redacted] The SS-N-15 is similar to the U.S. SUBROC. Both the SUBROC and ASROC will be phased out in the mid-1980s.

Page 15 is deleted.



[redacted]

[redacted]

[redacted] Table 3. Non-Soviet Warsaw Pact Short-Range (< 200 km) SLCM Platforms (1982)

[redacted]

| Country | Class | No. of Hulls | Launcher Type | Missile Range (km) |
|---|---|---|---|---|
| Bulgaria | OSA I | 3 | 4 single SS-N-2B/C | 40 or 80 |
| | OSA II | 1 | 4 single SS-N-2B/C | 40 or 80 |
| German Democratic Republic | OSA I | 15 | 4 single SS-N-2B/C | 40 or 80 |
| Poland | OSA | 13 | 4 single SS-N-2B/C | 40 or 80 |
| Romania | OSA | 5 | 4 single SS-N-2B/C | 40 or 80 |

[redacted] Reference: Military Balance 1982/83, Air Force Magazine, Volume 65, No. 12, December 1982.



[redacted]

[redacted]

[redacted] Table 4. NATO Short-Range (< 200 km) SLCM Platforms (1982)

[redacted]

| Country | Class | No. of Hulls | Launcher Type | Missile Range (km) |
|---|---|---|---|---|
| Belgium | E-71 Frigate | 4 | 4 Exocet | 40-70 |
| Britain | County Destroyer | 3 | 4 Exocet | 40-70 |
| | Type 22 Frigate | 4 | 4 Exocet | 40-70 |
| | Type 21 Frigate | 6 | 4 Exocet | 40-70 |
| | Leander Frigate | 18 | 4 Exocet | 40-70 |
| Denmark | Frigate Willemoes Fast Attack Craft (FAC) | 5 | 2 Quad Harpoon | 100 |
| | | 10 | 1 Harpoon | 100 |
| West Germany | Hamburg Destroyer | 4 | 4 Exocet | 40-70 |
| | Bremen Frigate | 1 | 2 Quad Harpoon | 100 |
| | Type 143 FAC | 10 | 4 Exocet | 40-70 |
| | Type 148 FAC | 20 | 4 Exocet | 40-70 |
| Greece | Kortenaer Frigate | 1 | 2 Quad Harpoon | 100 |
| | LaCombattante FAC | 8 | 4 Exocet | 40-70 |
| | " | 6 | 6 Penguin | 30 |
| Italy[a] | Maestrale Frigate | 1 | 4 Otomat | 60-180 |
| | Lupo Frigate | 4 | 8 Otomat | 60-180 |
| | Sparviero Hydrofoil | 3 | 2 Otomat | 60-180 |
| Netherlands | Tromp Destroyer | 2 | 2 Quad Harpoon | 100 |
| | Kortenaer Frigate | 6 | 2 Quad Harpoon | 100 |
| | Van Speijk | 6 | 2 Quad Harpoon | 100 |
| Norway | Oslo Frigate | 5 | 6 Penguin | 30 |
| | Storm FAC | 19 | 1 Penguin | 30 |
| | Hauk FAC | 14 | 1 Penguin | 30 |
| | Snögg FAC | 6 | 1 Penguin | 30 |
| Turkey | Dogan FAC | 4 | 2 Quad Harpoon | 100 |
| | Kartal FAC | 9 | 4 Penguin | 30 |
| France | Command Cruiser | 1 | 4 Exocet | 40-70 |
| | Suffren Destroyer | 2 | 4 Exocet | 40-70 |
| | C-70 Destroyer | 3 | 4 Exocet | 40-70 |
| | F-67 Destroyer | 3 | 6 Exocet | 40-70 |
| | T-53 Destroyer | 1 | 4 Exocet | 40-70 |
| | C-65 Destroyer | 1 | 4 Exocet | 40-70 |
| | Riviere Frigate | 8 | 4 Exocet | 40-70 |
| | Type A-69 Frigate | 8 | 2 Exocet | 40-70 |
| | Trident FAC | 4 | 6 Penguin | 30 |
| | LaCombattante | 1 | 4 Penguin | 30 |

[a] [redacted] The Italian Otomat (Teseo) may be capable of a range of 200 km or greater.

[redacted] Reference: Military Balance 1982/83 and The Ships and Aircraft of the U.S. Fleet, Naval Institute Press, Twelfth Edition, 1981.



[redacted]

[redacted]

2.2.7 [redacted] Discrimination Between Conventionally-Armed and Nuclear-Armed SLCMs

[redacted] There appears to be no clear way of distinguishing between conventionally-armed or nuclear-armed SLCMs without some form of on-site inspection including the use of nuclear detectors. And, even with intrusive inspections, it is still possible to circumvent limitations. Further, there will always be a necessary tradeoff between the intrusiveness of the inspection and the amount of technical information about the system inspected that could be compromised (e.g., nuclear or stealth technology).

2.3 [redacted] POSSIBLE NEGOTIATING OPTIONS

[redacted] Five possible SLCM negotiating options are analyzed in the study. Each option is discussed individually and assessed. Option 5, Establish Standard Load Requirements, has not been comprehensively analyzed because it requires more detailed information on U.S. and Soviet platforms, missiles, and operational practices than was available. For all options, the SALT II-type rule for launchers was considered to be applicable. The data used to analyze each of the options are provided in the appendix.

2.3.1 [redacted] Option 1: Limits on the Total Number of SLCM Platforms

[redacted] In this option, the total number of SLCM platforms would be restricted. The possibilities include (1) an overall limit on the number of platforms with a separate sublimit on long-range platforms and (2) individual limits [redacted] generic types of platforms, i.e., surface ships and submarines.

[redacted]

Pages 19 and 20 are deleted.



[redacted]

[redacted]

[redacted]

2.3.2 [redacted] Option 2: Limits on Total Number of SLCM-Capable Launchers

[redacted]

2.3.3 [redacted] Option 3: Limits on Platform Tonnage

[redacted]

---

* [redacted] The standard weight is the displacement of the submarine fully loaded and ready for sea but without fuels. This is not the submerged weight.



Pages 22 through 25 inclusive are deleted.

[redacted]

[redacted]

2.3.4 [redacted] Option 4: Aggregate Limits on Long- and Short-Range Platforms With a Separate Sublimit for "MIRVed" Platforms

[redacted]

2.3.5 [redacted] Option 5: Establish Standard SLCM Load Requirements

[redacted]

Page 27 is deleted.



[redacted]

[redacted]

[redacted]

2.4 [redacted] SUMMARY

[redacted]

---

* [redacted] This nominal load limit is analogous to the SALT II limit of 20 air-launched cruise missiles (ALCMs) per B-52.

[redacted]



Page 29 is deleted.
Page 30 is blank.

[redacted]